Downhower, J. F. 1976. Darwin's finches and the evolution of sexual dimorphism in body size. *Nature* 263: 558–563.
Dowsett, R. J. 1983. Sexual size dimorphism in some montane forest passerines from south-central Africa. *Bull. Brit. Orn. Cl.* 103: 59–64.
Earle, R. A. 1981. Weights of Southern African Sunbirds. *Durban Mus. Novit.* 13: 1–40.
Fogden, M. P. L. & Fogden, P. M. 1979. The role of fat and protein reserves in the annual cycle of the Grey-backed Camaroptera in Uganda (Aves: Sylviidae). *J. Zool. Lond.* 189: 233–258.
Fry, C. H. 1970. Migration, moult and weights of birds in northern Guinea savanna in Nigeria and Ghana. *Ostrich* supplement 8: 239–263.
Ginn, H. B. & Melville, D. S. 1983. *Moult in Birds*. BTO Guide No. 19, Tring.
Greig-Smith, P. W. & Davidson, N. C. 1977. Weights of West African savanna birds. *Bull. Brit. Orn. Cl.* 97: 96–99.
Hanmer, D. B. 1978. The effects of latitude and altitude on bird weights. *Scopus* 2: 35–39.
Hanmer, D. B. 1980. Mensural and moult data of eight species of kingfisher from Mocambique and Malawi. *Ostrich* 51: 129–150.
Johnson, D. W. 1985. Weight, moult, and breeding condition of some Malawi birds. *Ostrich* 57: 216–217.
Jones, P. J. 1984. The status of the pygmy kingfisher *Ceyx picta* in northeastern Nigeria. *Malimbus* 6: 11–14.
Karr, J. R. 1976. Weights of African birds. *Bull. Brit. Orn. Cl.* 96: 92–96.
Karr, J. R. 1976. Within- and between-habitat avian diversity in African and Neotropical lowland habitats. *Ecol. Monog.* 46(3).
Madgwick, J. In press. Somalia's threatened forests. *Oryx*.
Madgwick, J., Maunder, M., Varty, N. & Wood, B. 1988. Somalia Research Project: an ecological study of the remaining areas of riverine forest in the Jubba valley, southern Somalia. [Unpubl.] 172 pp.
Mann, C. F. 1985. An avifaunal study in Kakamega Forest, Kenya, with particular reference to species diversity, weight and moult. *Ostrich* 56: 236–262.
Moreau, R. E. 1944. Some weights of African and of wintering Palaearctic birds. *Ibis* 86: 16–29.
Okia, N. O. 1976. Birds of the understorey of lake-shore forests on the Entebbe Peninsula, Uganda. *Ibis* 118: 1–13.
Peirce, M. A. 1984. Weights of birds from Balmoral, Zambia. *Bull. Brit. Orn. Cl.* 104: 84–85.
Perrins, C. M. 1970. The timing of birds breeding seasons. *Ibis* 112: 242–255.
Pichi-Sermolli, R. E. G. 1957. Una carta geobotanica dell'Africa orientale (Eritrea, Etiopia, Somalia). *Webbia* 13: 15–132.
Svensson, L. 1984. *Identification Guide to European Passerines*. 3rd Ed. Stockholm.
Williams, J. G. & Arlott, N. 1980. *A Field Guide to the Birds of East Africa*. Collins.
Wood, B. In press. A mist netting study of birds in riverine forest, Somalia. *Ring & Migr.*

Address: Dr B. Wood, Ecology and Conservation Unit, Department of Biology, University College London, Gower Street, London WC1E 6BT.

Note on the osteology and taxonomic position of Salvadori's Duck *Salvadorina waigiuensis* (Aves: Anseridae [Anatidae]).

by Jiří Mlíkovský

Received 31 March 1988

Salvadori's Duck *Salvadorina waigiuensis* is an enigmatic bird of New Guinea mountain streams and lakes (Kear 1975), whose taxonomic

relations are even less known than its life habits. It was originally described in a separate genus, *Salvadorina*, by Rothschild & Hartert (1894). Mayr (1931) reevaluated their data, added brief comments on the osteology of *Salvadorina* and synonymised subsequently that genus with *Anas*. All subsequent monographs and lists of the waterfowl (e.g. Delacour 1956, von Boetticher & Grummt 1965, Johnsgard 1978, 1979, Kolbe 1984) followed Mayr's (1931) opinion. No further taxonomic study of *Salvadorina* has been undertaken.

I was recently able to obtain for study 2 partial skeletons of this duck from the Natural History Museum of Humboldt University in Berlin, East Germany (NKMB 0/874 and 0/876) which were collected in New Guinea in 1928 by Ernst Mayr and first described by himself shortly thereafter (Mayr 1931). Salvadori's Duck was not studied by either Verheyen (1953, 1955) or Woolfenden (1961) in their treatises on waterfowl osteology because of the scarcity of skeletons of *Salvadorina* in museum collections (none was reported by Wood & Schnell 1986). In view of this, it nevertheless seems useful to present here the relevant observations, in spite of their incompleteness. The present paper itself is a contribution to my long-term study of the taxonomy and evolution of the waterfowl.

OSTEOLOGY

The following bones of *Salvadorina waigiuensis* were available for study: 4 coracoids, 4 scapulae, proximal parts of 4 humeri, 2 sterna, 2 furculae and a pelvis. In general appearance these bones resemble those of dabbling ducks (Anatini) more than those of any other waterfowl tribe (see also Mayr 1931), but possess some highly specific features. The **humerus** of *Salvadorina* differs from that of *Anas* in having the head only slightly undercut by the capital groove and the pneumatic fossa ovaloid and very small. In the last 2 characters *Salvadorina* resembles *Malacorhynchus* (see Woolfenden 1961). The **coracoid** of *Salvadorina* resembles that of *Anas* and differs from that of diving tribes in having the angle between the axis of the head and the plane of the dorsal surface very small. The **Scapula** of *Salvadorina* differs from that of *anas* in having a knoblike process on the acromion, causing the anterior edge between the acromion and the glenoid facet to be concave. In this character *Salvadorina* agrees with the diving ducks. The **furcula** of *Salvadorina* differs from that of *Anas* in having the claviculae compressed, and the furcular process minute. The latter character *Salvadorina* shares with *Hymenolaimus* and various diving ducks (see Woolfenden 1961). The **sternum** of *Salvadorina* resembles that of *Anas*, particularly in having a ventral manubrial spine present, 7 costal facets, and in being relatively narrow. The narrowest width between the costal margins in relation to the maximum length of the sternum is 0.382 and 0.395, respectively, in the 2 study specimens. The **pelvis** of *Salvadorina* resembles that of *Anas*, especially in being rather broad. The ratio of the least width of the acetabula to the maximum length of the pelvis is 0.291; in *Hymenolaimus* it is 0.296 (Woolfenden 1961).

These differences argue strongly against the inclusion of *Salvadorina* in *Anas* (*contra* Mayr 1931), but give no usable clues as to its taxonomic re-allocation. It is noteworthy, however, that at least 2 other duck genera

occupy a similar taxonomic position, viz. *Hymenolaimus* from the mountains of New Zealand (Kear 1973) and *Malacorhynchus* from southeastern Australia and New Zealand (Frith 1967, Olson 1977). It might be speculated that these 3 aberrant, but otherwise *Anas*-like, genera are remains of an early radiation of the sub-family Anatinae (to which they undoubtedly belong) and that they stand closer to each other than to any other modern waterfowl tribe. Their general resemblance to the Anatini *sensu stricto* may well be misleading and does not necessarily imply true phylogenetic relationships. The constituents of Anatini form a morphologically generalised duck tribe (cf. Woolfenden 1961) which has become a taxonomic 'wastebasket' in which generally duck-like, but otherwise obscure genera are placed (cf. Mlíkovský 1983a, 1987).

It may thus be concluded (1) that Salvadori's Duck should not be included in the genus *Anas* and deserves separation at the generic level as *Salvadorina*, and (2) that it may, together with *Hymenolaimus* and *Malacorhynchus* form a relict genus of waterfowl that has survived up to the present, as have many other animals only in the Australian region. The relict nature of these genera and the expected prevalence of primitive features which characterise them, prevent their being properly defined as a tribe at present. The situation can be improved only after the extensive fossil record of the waterfowl (Brodkorb 1964, Howard 1964, Mlíkovský 1983b) is improved in the Australian region (cf. Rich & Van Tets 1982, Rich & Baird 1986) and completely re-evaluated; and after the internal anatomy of all waterfowl is studied in more detail. Complete skeletons and fluid-preserved specimens of *Salvadorina* are particularly needed.

Acknowledgements

I am grateful to Burkhardt Stephan (Berlin) for lending me the specimens of *Salvadorina waigiuensis*. The manuscript benefited from the suggestions of Storrs L. Olson and James F. Monk.

References:

Boetticher, H. von & Grummt, W. 1965. *Gänse- und Entenvögel aus aller Welt*. 2nd rev. ed. Wittenberg Lutherstadt: A. Ziemsen.

Brodkorb, P. 1964. Catalogue of fossil birds: Part 2 (Anseriformes through Galliformes). *Bull. Florida State Mus., Biol. Sci.* 8: 195–335.

Delacour, J. 1956. *The Waterfowl of the World,* II. Country Life.

Frith, H. J. 1967. *Waterfowl in Australia*. East–West Press.

Howard, H. 1964. Fossil Anseriformes. Pp. 233–326 in *Waterfowl of the World*, IV (J. Delacour, Ed.). Country Life.

Johnsgard, P. 1978. *Ducks, Geese and Swans of the World*. University of Nebraska Press.

Johnsgard, P. 1979. Order Anseriformes. Pp. 425–506 in *Check-list of Birds of the World,* I (E. Mayr & C. W. Cottrell, Eds.). Cambridge, Mass.: Museum of Comparative Zoology.

Kear, J. 1973. The Blue Duck of New Zealand. *Living Bird* 11: 175–192.

Kear, J. 1975. Salvadori's Duck of New Guinea. *Wildfowl* 26: 104–111.

Kolbe, H. 1984. *Die Entenvögel der Welt*. 3rd rev. ed. Neumann Verlag.

Mayr, E. 1931. Zur Anatomie und systematischen Stellung der Salvadori-Ente (*Salvadorina waigiuensis* Rothsch. & Hartert). *Ornithol. Monatsber.* 39: 69–70.

Mlíkovský, J. 1983a. On the foundations of biological systematics: a historical approach. Pp. 305–317 in *General Questions of Evolution* (V. J. A. Novák & K. Zemek, Eds.). Praha: ČSAV.

Mlíkovský, J. 1983b. *Fossil evidence for Waterfowl Evolution (Aves: Anseriformes)*. Unpubl. Thesis, Czechoslovak Academy of Sciences, Praha (in Czech).

Mlíkovský, J. 1987. Ecological bases of supraspecific evolution. Pp. 253–267 in *Biological Evolution* (V. Pesce-Delfino, Ed.). Adriatica Editrice.

Olson, S. L. 1977. Notes on subfossil Anatidae from New Zealand, including a new species of Pink-headed Duck (*Malacorhynchus*). *Emu* 77: 132–135.
Rich, P. V. & Baird, R. F. 1986. History of the Australian avifauna. *Current Ornithol.* 4: 97–139.
Rich, P. V. & Van Tets, G. F. 1982. Fossil birds of Australia and New Guinea: their biogeographic, phylogenetic and biostratigraphic input. Pp. 235–384 in *The Fossil Vertebrate Record of Australasia* (P. V. Rich & E. M. Thompson, Eds.). Monash University.
Rothschild, W. & Hartert, E. 1894. *Salvadorina waigiuensis* gen. et sp. nov. *Novit. Zool.* 1: 683–684.
Verheyen, R. 1953. Bijdrage tot de osteologie en die systematiek der Anseriformes. *Gerfaut* 43, Suppl.: 373–497.
Verheyen, R. 1955. La systématique des Anseriformes basée sur l'osteologie comparée. *Bull. Inst. Roy. Sci. Nat. Belgique* 31(35): 1–18, 31(36): 1–16, 31(37): 1–22, 31(38): 1–16.
Wood, D. S. & Schnell, G. D. 1986. *Revised World Inventory of Avian Skeletal Specimens, 1986*. AOU and Oklahoma Biological Survey.
Woolfenden, G. E. 1961. Postcranial osteology of the waterfowl. *Bull. Florida State Mus., Biol. Sci.* 6: 1–129.

Address: Dr. Jiří Mlíkovský, Department of Evolutionary Biology, Czechoslovak Academy of Sciences, Sekaninova 28, CS-128 00 Praha 2, Czechoslovakia.

Notes on the nests and eggs of some Ecuadorian birds

by Lloyd F. Kiff, Manuel Marin A., Fred C. Sibley, Juan Carlo Matheus and N. John Schmitt

Received 6 April 1988

Considering the richness of its avifauna, surprisingly little has been published on the nesting habits of Ecuadorian birds, the only major studies apparently being those of Marchant (1959, 1960), who reported on the breeding species in the semi-arid southwestern portion of the country. The Western Foundation of Vertebrate Zoology initiated a long-term study of the breeding habits of the birds of Ecuador in 1987. This preliminary report includes new breeding information on Ecuadorian birds, including the first descriptions of the nests and eggs, or both, of several species or races.

Two of the authors (MMA and FCS) worked from 29 July to 23 August 1987 in the relatively undisturbed primary wet forest surrounding the small Jivaro village of Tayuntza, elev. 600 m, 54 km SE of Macas, on the eastern slopes of the Cordillera de Cutucu, Morona-Santiago Prov. (2°43′S, 77°52′W). LFK and NJS visited Ecuador 8–27 October 1987 and conducted field work primarily in the Quito region and (with JCM) in paramo near La Virgen, Pichincha Prov., the highest point (4000 m,) on the road between Quito and Baeza, Napo Prov. Incidental collecting was done in several other localities on the eastern slope of the Andes during these periods.